Final
Closure Plan for the Off-Spec Pond

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May 2012

NWI-10094-002

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EXECUTIVE SUMMARY

This plan describes closure activities for the Off-Spec Pond located at the Chevron Phillips Chemical Puerto Rico Core, LLC (CPCPRC) Facility (Facility) in Guayama, Puerto Rico. CPCPRC intends to clean-close the Off-Spec Pond; a risk assessment was performed in accordance with standard U.S. Environmental Protection Agency (EPA) guidelines for risk assessment on soil, groundwater, sediment and vegetation data from the pond demonstrates that risks from constituents are below human health-based levels. Ecological risk assessment was not conducted for the Off-Spec Pond because the closure process will eliminate all exposure pathways for ecological receptors. As a good engineering practice, CPCPRC will voluntarily remove approximately 1 foot of sediment to minimize the perched water in the backfill.

Specifically, the closure of the pond will entail:

- Additional sampling the sediment to confirm the appropriate waste classification;
- Dewatering the pond;
- Treating the pond water in a skid-mounted treatment unit before releasing it to Puerto Rico Aqueduct and Sewer Authority (PRASA);
- Removal of sediment, piping and other appurtenances and vegetation and their offsite disposal;
- Backfilling the pond with clean soil and regrading and seeding the soil; and
- Post-closure groundwater sampling and analysis for 3 years after closure activities are completed.

Regulatory Background

During its operation, the Off-Spec Pond received discharges of off-spec water or washings from the mix box and clarifier. Water was considered to be off specification if it did not meet National Pollutant Discharge Elimination System discharge requirements or would otherwise result in an upset of the wastewater treatment system. The off-spec water and washings were recycled back to the mix box for additional treatment.

The Off-Spec Pond was subject to regulation as a hazardous waste surface impoundment under the Resource Conservation and Recovery Act (RCRA) because the wastewater in the pond exhibited the toxicity characteristic for benzene (EPA waste code D018). Under RCRA Section 3005, the pond must have either met RCRA minimum technology requirements under 40 Code of Federal Regulations 264.221 or stopped receiving hazardous waste by March 29, 1994. The Off-Spec Pond was removed from service in 1994, at which time it was completely emptied and allowed to dry. Listed (F037) sludge was removed from the Off-Spec Pond in the spring of 1994. The unit is currently inactive, and there are no reports of releases or releases into the groundwater from this earthen impoundment.

Subsurface Conditions

Subsurface conditions around the pond have been investigated through sampling at the Off-Spec Pond and through semi-annual RCRA monitoring of one upgradient well (MW-8R) and three downgradient monitoring wells (MW-152, MW-153 and MW-154).

The groundwater under the site is relatively shallow. Specifically, in the area of the Off-Spec Pond, the groundwater level intermittently rises above the pond bottom in the wet season (typically July through December). Water level measurements during the dry season (approximately January through June) show

that groundwater elevations are below the base of the Off-Spec Pond. This fluctuation in water levels resulted in groundwater and associated benzene contamination from the benzene plume upgradient of the pond to seep into the pond during the wet season. However, the groundwater data collected as part of on-going RCRA monitoring from the downgradient wells MW-152, MW-153 and MW-154 indicates that benzene is not detected and groundwater does not pose unacceptable risks to humans.

Risk Assessment Summary

Benzene, ethylbenzene and m&p-xylenes in soil were the only chemicals of concern (COC) identified in the risk assessment (Appendix B). The highest cancer risk of 6E-05 excess lifetime cancer risk (ELCR) is indicated for the industrial worker exposed to soil, while the highest non-cancer risk of 1.0 is indicated for the construction worker exposed to soil. The risks are driven by benzene. The COCs were found above conservative risk thresholds in only 2 of the 21 soil samples collected from the pond (locations OFF-7 and OFF-10). Both locations are adjacent to each other on the north or the upgradient side of the pond. Therefore, benzene contamination in soil is localized at OFF-7 and OFF-10 locations. Backfilling the pond with clean soil will eliminate the exposure pathway for the industrial worker.

Closure Approach

The clean-closure approach includes removal and cleaning of equipment and appurtenances associated with the pond operations, removal and offsite disposal of vegetation and approximately 1 foot of sediment. Although the sediment was sampled in 2007 and shown to be non-hazardous, the sediment waste classification will be confirmed for offsite disposal purposes prior to its removal.

In addition, one representative sample of the removed sediment will be collected from each quadrant of the pond to confirm that the excavated material is also non-hazardous. Four samples will be taken from the pond, one from the NE, NW, SE and SW quadrants and analyzed for the TCLP parameters shown in Table 6. The pond will then be backfilled with clean soil and graded to match the surrounding topography, and the area will be seeded with native vegetation. In addition, three years of groundwater sampling at the one upgradient well (MW-8R) and the three downgradient wells MW-152, MW-153 and MW-154 will be performed to demonstrate clean closure.

A certification that the Off-Spec Pond has been closed in accordance with the approved Closure Plan will be prepared by an independent qualified professional engineer. The certification will be accompanied by a closure report that details all closure activities for the Off-Spec Pond.

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ACRONYMS

AOC	Area of Concern
AST	Aboveground Storage Tank
bgs	below Ground Surface
BTEX	benzene, toluene, ethylbenzene and xylenes
CFR	Code of Federal Regulations
COC	Chemical of Concern
CMS	Corrective Measures Study
CPCPRC	Chevron Phillips Chemical Puerto Rico Core LLC
ELCR	Excess Lifetime Cancer Risk
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
HHRA	Human Health Risk Assessment
HI	Hazard Indices
MTBE	methyl-tert-butyl-ether
NPDES	National Pollutant Discharge Elimination System
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRG	Preliminary Remediation Goals
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SVOC	Semi-volatile Organic Compound
TC	Toxicity Characteristic
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
TOX	total organic halides
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

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Final Closure Plan for the Off-Spec Pond

1. INTRODUCTION

This Closure Plan has been prepared for the Off-Spec Pond at the Chevron Phillips Chemical Puerto Rico Core, LLC (CPCPRC) site (Figure 1), and describes the closure of the Off-Spec Pond. This Closure Plan has been prepared in accordance with 40 Code of Federal Regulations (CFR) 265 Subpart G and 40 CFR 265.228. The CPCPRC site contained three regulated units: the Oxidation Pond, the Ballast Water Basins and the Off-Spec Pond. This Closure Plan, which only addresses closure of the Off-Spec Pond, represents partial closure of regulated units at the CPCPRC Facility. The Ballast Water Basins were closed with regulatory approval in December 2006. Closure of the Oxidation Pond is being simultaneously addressed under a separate Closure Plan.

Closure activities at the Off-Spec Pond are expected to begin in the fourth quarter of 2012. CPCPRC intends to clean-close the Off-Spec Pond.

This Closure Plan also presents the results of a risk assessment that was performed to support the clean closure. A baseline Human Health Risk Assessment (HHRA) was conducted to evaluate potential risks to human receptors who may be exposed to soil and groundwater at the Off-Spec Pond. The objective of a baseline HHRA is to analyze the potential "baseline risk" (i.e., the risk that could occur if no action is taken to remediate the site) under current and future land use conditions. The HHRA was prepared in accordance with standard U.S. Environmental Protection Agency (EPA) guidelines for risk assessment (EPA, 1989, 1991, 2002, 2004a and 2004b) and the approach used for the approved Closure Plan for the Ballast Water Basins (CPCPRC, 2003). The results of the risk assessment were used to determine if additional corrective measures are warranted at the Off-Spec Pond, or if the pond could be clean-closed.

This Closure Plan includes:

- **Description of Site.** A brief description of the Off-Spec Pond area of the CPCPRC site is presented in Section 2.0. This section also discusses the ongoing site-wide corrective action work at the site, sampling that has been performed to characterize the soil at the base and along the sidewalls of the pond, sediment and vegetation in the pond and groundwater. In addition, this section presents a summary of the results of the HHRA that support the closure approach.

- **Closure Performance Standards.** Section 3.0 discusses how the Closure Plan addresses the closure performance standard under 40 CFR 265.111.

- **Closure Procedures.** Section 4.0 discusses how the closure will be performed, what will be done after completion of closure and the schedule for closure.

- **Closure Cost Estimate and Financial Assurance.** Section 5.0 presents the most recent closure cost estimate and references the financial assurance mechanism.

- **References.** References are included in Section 6.0.

Appendices included with this Closure Plan are:

- Appendix A – Data Summary Tables and Data Validation Reports,

- Appendix B – Risk Assessment with Background Comparisons for Soil,

- Appendix C – Closure Cost Estimate;
- Appendix D – Standard Operating Procedures, and
- Appendix E – Responses to March 2012 Comments.

2. DESCRIPTION OF THE SITE AND OFF-SPEC POND AREA

This section provides a general description of the CPCPRC Facility and the Off-Spec Pond. The site-wide corrective action work being conducted at the Facility is also discussed and is intended to provide the context for the relationship between the site-wide work and the Off-Spec Pond closure. Site-specific conditions that govern the requirements of the closure procedures and schedule are presented, including local geology, hydrogeology and the soil, vegetation and groundwater sampling to characterize the Off-Spec Pond. The results of the risk assessment (Appendix B) are also presented in this section.

2.1 CPCRC Facility

The CPCPRC Facility is 211-acres in size and is located on the southeast coast of Puerto Rico (Figure 1), centered at approximately 17°56'45" north latitude and 66°08'30" west longitude. CPCPRC is located approximately 0.25 mile north of the Caribbean Sea. The Facility was formerly a petrochemical plant and in August 2008, CPCPRC announced the permanent cessation of operations at the Facility and its intent to decommission and dismantle the process units, tanks and related equipment. The dismantling activities are complete and the progress has been reported to the EPA and the Environmental Quality Board (EQB) on a monthly basis.

CPCPRC was constructed in 1966 on land previously graded and used for sugar cane cultivation. Elevations range from 45 feet above mean sea level at the northern portion of CPCPRC, to less than 5 feet above mean sea level at the southern boundary. During the time the Off-Spec Pond was operational, CPCPRC processed naphtha into light hydrocarbon products by fractional distillation and other processes. Benzene, toluene, xylenes, cyclohexane, liquid petroleum gas and gasoline were the primary products produced.

Modifications to the water treatment Facility in 1994 eliminated the need for the Off-Spec Pond that previously served as a storage pond for wastewater discharge that would result in an upset of the wastewater treatment system. The off-spec water and washings were recycled back to the mix box for additional treatment. The Off-Spec Pond is the subject of this Closure Plan.

2.2 Ongoing Corrective Actions

Site-wide corrective actions are currently being conducted at the site. The corrective action work includes final investigation activities at Areas of Concern (AOCs) identified during the Facility demolition, semi-annual groundwater, surface water and sediment sampling that has been ongoing since 1999 and the implementation of interim measures to remediate groundwater contamination. In summary, the environmental impacts from Facility operations include petroleum hydrocarbon contamination in soil groundwater. Specifically, four groundwater plumes have been identified and the AOC investigation work supports the hypothesis that these plumes are the result of inadvertent releases from aboveground storage tanks (ASTs). These plumes are stable or retreating in extent and are being monitored and remediated through interim actions. The most recent extent of petroleum hydrocarbon contamination is depicted in Figure 2.

Currently, the AOC investigation work is being finalized and a site-wide risk assessment and a Corrective Measures Study (CMS) will be developed. The CMS will present the site-wide remedy for addressing Facility related soil, groundwater, surface water and sediment contamination.

2.3 Off-Spec Pond

The Off-Spec Pond is located in a gated and guarded site controlled by CPCPRC. The Off-Spec Pond is a below-grade rectangular impoundment with unlined earthen sides and bottom. The perimeter of the pond is bermed to prevent precipitation run-on into the pond.

The Off-Spec Pond is 345 feet by 90 feet, and approximately 5 feet deep. The pond was designed to hold up to 3 feet of water (an approximate total capacity of 700,000 gallons). The pond was constructed with an inward slope of 3:1 (horizontal:vertical). During its operation, the Off-Spec Pond received discharges of off-spec water or washings from the mix box, Off-spec Pond and clarifier. Water was considered to be off specification if it did not meet National Pollutant Discharge Elimination System (NPDES) discharge requirements or would otherwise result in an upset of the wastewater treatment system. The off-spec water and washings were recycled back to the mix box for additional treatment.

The Off-Spec Pond became a regulated (Interim Status) hazardous waste management unit in September 1990 as a result of the management of toxicity characteristic (TC) (DO18) wastewaters. Listed (F037) sludge was removed from the Off-Spec Pond in the spring of 1994. The unit is currently inactive, and there are no reports of releases or releases into the groundwater from this earthen impoundment.

During the rainy season (approximately July through December), groundwater elevations may be above the elevation of the base of the pond. As a result, groundwater intermittently seeps into the pond. Any water currently in the pond is the result of this groundwater seepage or a result of incipient rainfall from storm events. It is noted that the Facility stormwater drainage system is designed and functions to drain all non-contact surface water around the Facility and contact surface water from the Former Process Area to the Final Holding and Stormwater Ponds. Stormwater in the Final Holding and Stormwater Ponds is treated through the onsite wastewater treatment plant (WWTP). Outfall #001 is used for the discharge from the WWTP. Outfalls 002-005 are used for the discharge of all non-process areas at the Facility. Therefore, no stormwater drains into the Off-Spec Pond. In addition to water, a thin layer of sediment (about 3 to 6 inches thick) is present and vegetation has taken root.

Since 1996, groundwater monitoring has been conducted and the result of this monitoring are presented in annual reports to the EPA and EQB. The groundwater monitoring includes the semi-annual collection of groundwater samples for pH, specific conductance, total organic carbon (TOC), total organic halides (TOX), benzene, ethylbenzene, toluene and xylenes (BTEX), methyl-tert-butyl ether (MTBE), and annual collection of phenolics, chloride, iron, manganese, sodium and sulfate from one upgradient well, MW-8R, and three downgradient wells (MW-152, MW-153 and MW-154). Figure 2 presents the benzene concentrations at the four monitoring wells located around the Off-Spec Pond. As shown in Figure 2, benzene was not detected in any of these four wells during the June 2011 sampling event.

Historically, benzene levels have been elevated at MW-8R as a result of the plume emanating from the AST storage north of the Off-Spec Pond. The last five years of historical benzene data are presented in time-trend plots of benzene concentrations at the four wells surrounding the Off-Spec Pond (Figure 3), As shown in Figure 3, benzene has not been detected in the wells (MW-152, MW-153 and MW-154) immediately downgradient of the pond. Benzene was detected in August 2006 at a concentration of 2,170 micrograms per liter (µg/L), in the upgradient well, MW-8R. Benzene has not been detected at MW-8R since 2006.

2.4 Site Geology and Hydrogeology

Geologic data collected during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report (CPCPRC, 1999) and during numerous voluntary investigations indicate that the CPCPRC Facility is underlain by depositional sequences associated with an alluvial fan/transitional marine environment.

At the base of the system, Andesite bedrock is found. The bedrock is typically found at about 80 feet below ground surface (bgs). The Andesite bedrock does not act as an aquifer in the vicinity of the site (USGS, 1992). Above the bedrock is the lower alluvial aquifer. The lower alluvial aquifer is present beneath the entire Facility and the top of the unit is typically found at about 25 feet bgs. The aquifer materials consist primarily of fine to medium sand with some gravel. Groundwater flow in this aquifer is generally to the south. Ultimately, groundwater in this aquifer discharges to the Caribbean Sea.

Above the lower alluvial aquifer, a clay layer is typically found. This clay layer forms a discontinuous aquitard between the lower and upper alluvial aquifers. The top of the aquitard is typically found between 15 and 20 feet bgs. Above the aquitard is the upper alluvial aquifer, which extends from the ground surface to about 15 feet bgs. The upper alluvial aquifer was deposited in an alluvial fan/transitional marine environment. The aquifer materials consist of widely varying combinations of silt, sand and gravel.

Groundwater flow is to the south and seasonally, the groundwater levels may periodically be above the pond bottom, as discussed above.

2.5 Characterization Sampling

In December 2006, CPCPRC submitted the final Sampling and Analysis Plan/Quality Assurance Project Plan for the Off-Spec Pond (the Sampling Plan; CPCPRC, 2006). The objective of the sampling was to gather information in support of a risk assessment and closure activities. The Sampling Plan detailed the procedures for sampling and the analysis required for the following activities:

- Collecting representative samples of the soil at the base and along the sidewalls of the Off-Spec Pond; and

- Collecting representative samples of the sediment and vegetation within the Off-Spec Pond.

In March and April 2007, CPCPRC performed the sampling activities and the characterization data and detailed quantitative risk assessment are presented in Appendix A and Appendix B, respectively. CPCPRC selected sampling methods and procedures designed to yield representative analytical results that could be used to assess the presence of the constituents in the Off-Spec Pond, and to assess the disposal characteristics of the soil, sediment and vegetation in the pond.

In accordance with the Sampling Plan (CPCPRC, 2006), CPCPRC collected 21 soil samples from the sides and the bottom of the pond (Figure 4), seven sediment samples (Figure 5), and four vegetation samples (Figure 6).

Background soil samples have been collected over a period of time in support of other investigative efforts. These background data were used for a statistical comparison with the Off-Spec Pond soil samples (Appendix B). The locations of the background samples are shown on Figure 7.

The soil samples were analyzed for the Modified Skinner List of 63 constituents including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals (Table 1). In addition, the soil samples were analyzed for the Toxicity Characteristics Leaching Procedure (TCLP) list of 31 constituents (Table 1). The sediment and vegetation samples were analyzed for the TCLP list of constituents.

The chemicals that were detected in the soil samples, vegetation TCLP samples and sediment TCLP samples are presented in Tables 2 through 4, respectively. There were no detections in the TCLP analysis of the soil and sediment. The TCLP data indicated that none of the material samples were characteristically hazardous. The full analytical results for all media are located on the attached CD in Appendix A (Excel file: CrossTab_Off-Spec Pond all data.xls). The file contains separate worksheets for each sampled media with the complete data and the risk-based comparison concentrations. The media to be disposed of, such as sediment and vegetation, also include the TCLP regulatory limits for a comparison with the sample data.

As discussed in Section 2.3, groundwater samples have been collected since 1996 as part of on-going monitoring effort. This monitoring includes sampling one upgradient well MW-8R and three downgradient wells including MW-152, MW-153 and MW-154. For the risk assessment (Appendix B), the groundwater data from the last 5 years of monitoring was used because these data best represent the current groundwater quality in the area. The locations of the monitoring wells are presented on Figure 2.

2.6 Risk Assessment Summary

A baseline HHRA was conducted to evaluate potential risks to human receptors who may be exposed to soil and groundwater at the Off-Spec Pond. The HHRA is presented in Appendix B, and it was prepared in accordance with standard EPA guidelines for risk assessment. Ecological risk assessment was not conducted for the Off-Spec Pond because the closure process will eliminate all exposure pathways for ecological receptors. Specifically, the closure of the pond will remove all surface water in the pond, all vegetation will be removed and the pond will be backfilled. A detailed description of the closure procedure for the Off-spec Pond is located in Section 4 of this document.

2.6.1 Summary of the Human Health Risk Assessment

This section presents a summary of the risk assessment. The complete risk assessment procedures and methods are described in Appendix B and are summarized in Table 5. As shown in Table 5, the highest excess lifetime cancer risk (ELCR) of 6E-05 was indicated for the industrial worker exposed to soil, while a hazard index (HI) of 1.0 was indicated for the construction worker exposed to soil. The risk driver is benzene. Benzene was above its calculated preliminary remediation goal (PRG) in only two locations, OFF-7 and OFF-10. The locations are adjacent to each other and along the north or the upgradient side of the pond (Figure 4). The samples on either side of these locations (OFF-4 and OFF-13) did not have benzene levels above the PRG. Therefore, it is concluded that the benzene contamination in soil is localized at OFF-7 and OFF-10.

Of a particular note is the fact that a groundwater benzene plume is emanating from the tank basin upgradient of the Off-Spec Pond. This benzene plume has been documented in various site reports and the map presenting the current extent of the plume is presented in Figure 2. Figure 2 shows that the plume extent is near the northeast corner of the Off-Spec Pond. It is further noted that benzene levels in groundwater have declined significantly and this plume has contracted in size over the last 5 years. Historically, the plume extended further to the south intersecting the northern edge of the Off-Spec Pond.

Further evidence that the groundwater plume has impacted the soil in the Off-Spec Pond is found by examining well construction logs and groundwater level data. Well construction logs located in Appendix B of the RFI Report (CPCPRC, 1999) and water level measurements from Table 4 of the RCRA 2008 Annual Report (CPCPRC, 2009) show that during the wet season (approximately July through December) groundwater levels at MW-8R, MW-152, MW-153 and MW-154 may be above the base of the Off-Spec Pond. Water level measurements during the dry season (approximately January through June) show that groundwater elevations are below the base of the Off-Spec Pond. This fluctuation in water levels would have allowed groundwater and associated benzene contamination from the plume to seep into the pond during the wet season.

Considering the source of benzene upgradient of the pond and the limited benzene exceedances in the two soil samples, and the fact that the Off-Spec Pond risks are within the acceptable risk guidelines, the pond can be clean-closed without a need to excavate any soil.

3. CLOSURE PERFORMANCE STANDARDS

This section describes the closure performance standards to be met during closure of the Off-Spec Pond, partial and final closure activities, maximum waste inventory, amendments to the Closure Plan, notification of final closure of the pond, expected date of closure and the closure schedule.

3.1 Closure Performance Standards [40 CFR 265.111]

40 CFR 265.111 requires that closure be performed in a manner that accomplishes the following:

- Minimizes the need for further maintenance;
- Controls, minimizes or eliminates post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff or hazardous waste decomposition products to the ground, and surface waters or to the atmosphere; and
- Complies with the closure requirements of 40 CFR 265 Subpart G and unit-specific closure requirements.

These goals will be accomplished by dewatering the pond and removing approximately 1 foot of sediment and vegetation from the pond and removing or decontaminating all associated appurtenances (i.e., headwall structure). Structures or equipment that cannot be successfully decontaminated will be dismantled and transported to an offsite permitted disposal Facility. The Off-Spec Pond will be clean-closed to minimize the need for further maintenance and post-closure care.

The specific pond media that will be addressed as part of pond closure, their fate and the applicable chemical-specific performance standards are summarized below. The chemical-specific performance standards are listed by media in Table 6.

The detailed description of the closure process is provided in Section 4.0 of this Closure Plan.

At completion of clean closure, no hazardous constituent concentrations exceeding the closure performance standards (i.e., TCLP limits or the risk-based PRGs) will remain.

3.1.1 Pond water

Any water in the Off-Spec Pond at the time of closure will be treated by the skid-mounted treatment unit and released to PRASA. Water in the Off-Spec Pond was sampled in June 2011 and these data were used

specifically to design a skid-mounted water treatment process that would treat water to the PRASA discharge limits. The maximum detected concentrations in the Off-Spec Pond, and a comparison of the detected concentrations with the PRASA and the TCLP criteria is presented in Table 7.

The data comparison in Table 7 shows that the concentrations in the pond water are several orders-of-magnitude below the TCLP criteria; therefore, the pond water is considered non-hazardous. However, the maximum concentrations of manganese (1.13 mg/L) and nickel (0.088 mg/L) did exceed the respective PRASA discharge limits of 0.14 mg/L and 0.02 mg/L. These levels of manganese and nickel are not an issue because the skid-mounted unit is designed to reduce the manganese and nickel levels (and any other constitutes present) to below the PRASA discharge limits.

3.1.2 Decontamination Water

The appurtenances, such as piping associated with the Off-Spec Pond, have been in contact with the pond water and soil/sediment. As part of closure, these items will be decontaminated before their disposal. The appurtenances will be removed and pressure washed and the rinse water will drain into the pond. The appurtenances will be visually examined for the presence of deposits and washed again, if necessary. The washed appurtenances will be disposed of in an offsite Subtitle D landfill. The decontamination water will be treated in the skid unit before release to PRASA.

Other decontamination water produced from washing the excavation and backfilling equipment is not expected to be hazardous because the materials handled by the equipment, e.g., sediment, have been determined to be non-hazardous through TCLP testing. The decontamination water will be treated in the skid unit to meet the PRASA discharge requirements.

3.1.3 Vegetation

Four samples of vegetation were subjected to TCLP in 2007, with no exceedances of the TCLP regulatory limits (Table 3). Barium was the only chemical detected in the TCLP leachate at a maximum concentration of 0.44 mg/L compared to the TCLP limit of 100 mg/L (Table 9). New vegetation has taken root in the pond; however, there is no reason to believe the new vegetation would be different in character from the vegetation sampled in 2007. Resampling of the vegetation is unnecessary; therefore, it will not be performed. The vegetation will be removed from the pond and the dirt adhering to its roots will be washed into the pond. The dirt-free vegetation will be mulched and disposed of or reused onsite to minimize erosion from newly vegetated areas. The complete 2007 vegetation TCLP data are presented in Appendix A.

3.1.4 Appurtenances

The appurtenances such as piping associated with the Off-Spec Pond have been in contact with the pond water and soil/sediment. It would be necessary to decontaminate the appurtenances before their disposal. As part of closure, these items will be removed and pressure washed to dislodge the deposits into the pond. The appurtenances will be visually examined for the presence of deposits and washed again, if necessary. The washed appurtenances will be disposed of in an offsite Subtitle D landfill. As mentioned in Section 3.1.2, the decontamination water will be treated in the skid unit before release to PRASA.

3.1.5 Sediment

Seven samples of this sediment were collected and subjected to TCLP analyses in 2007 with no detections of the TCLP chemicals in the leachates (Table 4). Additional minor amounts of wind-blown dust may have accumulated on top of the tested sediment since 2007; however, there is no reason to

believe that the character of the sediment has changed. Regardless, to address EPA's concerns, eight more discreet samples of the sediment will be collected and analyzed by TCLP methods. Separate sample aliquots will be collected for the TCLP-VOCs and TCLP-SVOCs/TCLP-metals. The TCLP-VOC samples will be collected with a minimal sample handling and minimal headspace in the sample jar to reduce VOC loss. The sampling procedure is summarized in Appendix D.

The results for the eight additional sediment samples will be provided separately as an Addendum to the Closure Plan. CPCPRC plans to sample this sediment in June/July 2012.

3.1.6 In-place Soil and Groundwater

Twenty-one samples of soil were analyzed in 2007 to assess the risks (see Section 2.6 and Appendix B for a summary of results and risks). The performance standards for the in-place soil and groundwater within the Off-Spec Pond footprint are the lowest risk-based concentrations calculated for the applicable receptors (i.e., the PRGs). The risk assessment indicates that the risk from the soil and groundwater was acceptable; therefore, the performance standards soil and groundwater (i.e., the PRGs) have already been satisfied.

3.2 Partial and Final Closure Activities [40 CFR 265.112(b)(1) through (b)(7)]

The scope of this Closure Plan is final closure of the Off-Spec Pond, which is a partial closure of the Facility. Another pond, the Oxidation Pond, is being addressed in a separate Closure Plan.

A thorough discussion of the closure activities is presented in Section 4. Closure of the pond will consist of activities undertaken to satisfy the requirements of 40 CFR 265, Subpart G. The activities for closure are as follows:

- Remove all rainwater/groundwater in the Off-Spec Pond, treat and dispose via the skid unit discharging to PRASA (See Section 4).
- Remove and dispose of the vegetation and approximately 1 foot of sediment at an offsite disposal facility. The sediment and vegetation will be removed to facilitate the backfilling of the pond.
- Decontaminate the equipment associated with the pond by hand-cleaning or pressure washing and removing to a permitted disposal Facility.
- Dismantle contaminated equipment structures that cannot be cleaned, if necessary, and transport to a disposal Facility.
- Grade the area so that the topography matches that of the surrounding area.
- Re-seed the area with native vegetation.

3.3 Maximum Waste Inventory [40 CFR 265.112(b)(3)]

The full capacity of the pond is estimated to be approximately 700,000 gallons. The pond has an unknown quantity of rainwater accumulated. The quantity of the water will be estimated at the time of dewatering the pond and sending the water to the skid unit.

CPCPRC will keep a copy of the Closure Plan as part of the record of operations at the Facility until closure is completed and certified. CPCPRC will notify the appropriate regulatory agencies, including

EPA Region 2, EPA's Caribbean Section and the EQB, when it is ready to close the Off-Spec Pond as required by 40 CFR 265.112(d).

3.4 Amendments to Closure Plan [40 CFR 265.112(c)]

If it is necessary to revise this Closure Plan, CPCPRC will submit a copy of the amended Closure Plan to EPA Region 2, EPA's Caribbean Section and the EQB. CPCPRC will submit an amended Closure Plan under the following conditions:

- Changes are made in operating plans or the regulated units that affect the Closure Plan;
- The expected year of closure (i.e., fourth quarter 2012; first quarter 2013) is changed; and
- Unexpected events occur during closure that affect the Closure Plan.

If revisions are necessary, CPCPRC will send the request for an amended Closure Plan within the following time frames:

- At least 60 days before a proposed change in Facility design or operation is expected to occur;
- Within 60 days of an unexpected change in Facility design or operation; and
- Within 30 days of an unexpected event that occurs during the closure period.

3.5 Notification of Closure [40 CFR 265.112(d)]

After this Closure Plan is approved, CPCPRC will notify EPA Region 2, EPA's Caribbean Section and the EQB by letter at least 60 days before closure activities are expected to begin. The letter will state the date closure is expected to begin.

3.6 Expected Date of Closure [40 CFR 265. 112.(b)(7)]

It is expected that closure activities will start in 2012 and will continue through 2013. Three years of post-closure monitoring will be completed in 2016. Table 8 of this document presents the anticipated durations of each activity associated with the closure.

3.7 Closure Schedule [40 CFR 265.113]

3.7.1 Time Allowed for Closure [40 CFR 265.112(b)(6), 265.113(b)]

Table 8 shows an anticipated schedule for closure of the Off-Spec Pond. CPCPRC anticipates completing closure activities within 125 days of beginning closure activities.

Within 60 days of completion of closure, CPCPRC will submit to EPA Region 2, EPA's Caribbean Section and the EQB a certification that the unit has been closed according to the approved Closure Plan. The certification will be signed by the owner or operator, and by an independent, registered professional engineer.

If an unexpected event occurs during the closure period (e.g., the unavailability of laboratory analysis results), CPCPRC will notify EPA Region 2 and EPA's Caribbean Section of the change no later than 30 days after the unexpected event.

3.7.2 Extension for Closure Time [40 CFR 265.113(b)]

If closure cannot be accomplished within 135 days because of unforeseen events, CPCPRC will request a schedule extension from EPA Region 2 (with a copy to EPA's Caribbean Section and EQB) at least 30 days before the expiration of the 125-day closure period, in accordance with 40 CFR 265.113(c)(2).

4. CLOSURE PROCEDURES

A risk assessment for the constituents present in the soil and groundwater has been developed (Appendix B). Soil and groundwater analytical results have been compared to risk-based PRGs; potential risks associated with exposure to soil and groundwater in the Off-Spec Pond area are within the EPA's risk management range.

A certification that the Off-Spec Pond has been clean-closed in accordance with the approved Closure Plan will be prepared by an independent qualified professional engineer. The certification will be accompanied by a closure report that details all closure activities for the Off-Spec Pond and will be submitted to EPA Region 2, EPA's Caribbean Section and the EQB within 60 days of the completion of closure.

4.1 Closure Procedures [40 CFR 265.112 and 265.114]

This section describes the closure procedures for the Off-Spec Pond. As indicated in Section 2.6, samples from the base and sidewalls of the pond demonstrate that the soil is within acceptable risk thresholds. In addition, downgradient groundwater concentrations are below PRGs.

The following steps have been or will be completed for closure:

- A detailed, quantitative risk assessment (Appendix B) has been performed to determine cleanup levels (i.e., the risk-based PRGs);
- The PRGs have been compared to analytical results of soil in the pond and groundwater in the pond area;
- All free liquids (if present) will be removed and treated via a permitted wastewater treatment process (i.e., the skid unit discharging to PRASA);
- The sediment, appurtenances and vegetation will be removed and disposed of offsite;
- The pond will be backfilled with clean fill, and the area will be graded and revegetated; and
- Annual groundwater monitoring will be performed for the one upgradient well (MW-8R) and the three monitoring wells downgradient of the pond (MW-152, MW-153 and MW-154) for a period of 3 years following the completion of closure.

It is noted that CPCPRC anticipates that in addition to the in-situ sampling, additional sampling of removed materials (e.g., the sediment and vegetation) will be needed prior to disposal to meet the specific requirements of the on-island disposal facility.

4.2 Free Liquids Removal and Sediments/Vegetation Sampling, Analysis and Removal

Before initiating closure, all standing water in the Off-Spec Pond will be pumped, treated and discharged via the permitted skid-mounted wastewater treatment process discharging to PRASA. The water in the pond was sampled in 2011for the Modified Skinner list of constituents and applicable constituents to meet discharge requirements (i.e., PRASA discharge limits). The skid-mounted unit has been designed to treat the pond water to meet the PRASA discharge requirements.

The sediment and vegetation have been analyzed by the TCLP methodology, and determined to be non-hazardous. However, sediment will be re-characterized prior to removal by collecting eight in-situ samples. Vegetation will not be resampled.

In addition, one representative sample of the removed sediment will be collected from each quadrant of the pond to confirm that the excavated material is also non-hazardous. Four samples will be taken from the pond, one from the NE, NW, SE and SW quadrants and analyzed for the TCLP parameters shown in Table 6.

The total volume of sediment is estimated at 1,200 yd^3. The vegetation volume is expected to be minimal. Sediment and vegetation will be removed and disposed of at an offsite disposal Facility located on the island.

4.3 Removal of Appurtenances and Debris

Following the removal of any free liquid, appurtenances and debris that inhibit clean closure of the Off-Spec Pond will be removed and cleaned. The contamination water will be treated in the skid unit and discharged to PRASA.

The appurtenances and debris will be cleaned until they meet the visual criteria listed in Table 1 of 40 CFR 268.45 for chemical extraction, water washing and spraying. This table states that the appurtenances and debris will be treated to a "clean debris surface." As stated in 40 CFR 268.45, "a clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area." Upon meeting the clean debris surface criteria, the appurtenances and debris will be considered non-hazardous and will be disposed of or recycled.

4.4 Verification Sampling and Analysis

Soil in the pond was sampled in 2007 and was found to pose no adverse risks (Appendix B). Considering this, verification sampling and analysis of soil is unnecessary.

Although not required, subsequent to clean closure, CPCPRC will perform annual groundwater monitoring for 3 additional years following the pond closure. Groundwater samples will be collected from the one upgradient well (MW-8R) and the three downgradient wells (MW-152, MW-153 and MW-154; Figure 2) and analyzed for BTEX. The upgradient well, MW-8R, will establish the level of groundwater contamination upgradient of the pond. The downgradient wells, MW-152, MW-153 and MW-154, will be sampled to determine if any groundwater contamination is derived from the ponds after closure. The results of this sampling will be presented in an annual report to EPA and the EQB.

4.5 Decontamination

Equipment used during the removal of debris and appurtenances, removal of vegetation, or the removal of free liquid from the pond will be decontaminated by pressure washing. Wastewater generated from the decontamination will be treated in the skid unit and discharged to PRASA.

4.6 Pond Backfilling

The pond will be backfilled with approximately 11,000 yd^3 of certified clean fill and compacted to a minimum of 95% of dry density.

4.7 Pond Grading and Revegetation

The pond will be graded to closely resemble the current surrounding topography. The graded area will be re-seeded with native vegetation. The final grading of the pond will be such that the former pond area will not accumulate or pond water after the closure. The slope of the final grading will allow for proper drainage of the area to prevent excessive infiltration of precipitation due to ponding.

4.8 Continuance of Operations

4.8.1 Groundwater Monitoring

Although not required by 40 CFR 265 for clean closure, CPCPRC will perform groundwater monitoring on an annual basis for three years after closure construction is complete. Wells that will be sampled are listed in Section 4.4, and groundwater removed from these wells will be analyzed for BTEX. Table 9 presents the criteria that will be used to evaluate groundwater quality. The criteria represent the PRGs developed as part of the risk assessment (Appendix B).

4.8.2 Elimination of Free Liquids

If stormwater accumulates in the pond during closure activities due to a storm event, it will be removed, treated in the skid unit and discharged to PRASA.

4.8.3 Security

Security at the Off-Spec Pond is currently provided by CPCPRC 24 hours per day, 7 days per week. This security will continue in conjunction with overall Facility security.

4.9 Closure Certification and Reporting

CPCPRC will close the Off-Spec Pond in accordance with 40 CFR 265. 111. This regulation states that the operator/owner must close the Facility in a manner that "controls, minimizes, or eliminates, to the extent necessary to protect health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous decomposition products to the ground or surface waters or to the atmosphere." CPCPRC intends to demonstrate clean closure of the Off-Spec Pond in a manner that is protective of human health and the environment.

In accordance with 40 CFR 265.115, a certification that the Off-Spec Pond has been closed in accordance with the approved Closure Plan will be prepared by an independent, qualified professional engineer. This certification will be signed by both the engineer and a representative of CPCPRC. Any

new laboratory analytical data generated in support of the closure will be certified and validated by a Puerto Rico certified chemist or an engineer.

The certification will then be submitted, by registered mail, to the EPA Regional Administrator within 60 days of the completion of closure. The certification will be accompanied by a closure report, which details all closure activities for the Off-Spec Pond. The closure report will provide documentation that the pond was closed in accordance with the approved Closure Plan.

Within 60 days after receiving this certification, EPA is to notify CPCPRC in writing that they are no longer required to maintain financial assurance for closure, unless the EPA has reason to believe that closure has not been conducted in accordance with the approved Closure Plan. Clean closure will be considered complete upon receipt of this letter from EPA.

4.10 Clean Closure Contingency

In the unlikely event, closure performance standards cannot be achieved or is not practical, then a contingency-closure and post-closure plan will be implemented. The "regulated closure" procedures (Section VI.C.3.d) and Post-Closure Care plan (Section VI.L) of the CPCPRC Part B Permit Application (September 1991) will be modified and submitted to the Agency, along with an application for a RCRA Post-Closure Care permit. These submittals will be made within six months of CPCPRC's determination that clean closure is not feasible or practicable.

5. CLOSURE COST ESTIMATE AND FINANCIAL ASSURANCE

5.1 Closure Cost Estimate

In accordance with 40 CFR 265.142, a closure cost estimate was prepared for the Off-Spec Pond. The closure cost estimate is presented in detail in Appendix C. Total cost of approximately $553,005 is estimated for the closure procedures. These costs include the closure construction activities and three years of post-closure groundwater monitoring and reporting. All cost assumptions are detailed in Appendix C.

5.2 Financial Assurance Mechanism

A financial assurance mechanism is on file with EPA and is updated annually in accordance with 40 CFR 265.143. The total amount for this financial assurance mechanism is intended to cover post closure monitoring and closure of the Off-Spec Pond ($553,005) and Oxidation Pond ($1,091,367). The allotted amount is sufficient for closure.

6. REFERENCES

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